DigiPump SR8x

Syringe Pump

Operator's Manual

DIGICARE
BIOMEDICAL TECHNOLOGY

DRIVEN BY INNOVATION IN MEDICINE

Contents

1. Introduction…….....2
1.1 Product Information……2
1.2 Indication of Use……2
1.3 Safety…….…....2
1.4 Product Functions and Features…….….3
1.5 Technical Specifications…….……3
1.6 Product Description…….……..5
1.7 Symbols and Labels…….……..5
1.8 Product Components…….……7
1.9 Battery Operation…….……..8
1.10 Pump Installation…….……..9
2. Infusion Settings…….……9
2.1 Rate Mode……10
2.2 Time Mode……..11
2.3 Body Weight Mode……11
2.4 Volume and Time Indicators…….....12
3. Operation…….…...…12
3.1 Basic Operation Steps…….……12
4. Configuration……...…..15
4.1 Configuration Screen……...…15
4.2 Configuration Menu Description…….…..16
4.3 Configuration Menu Operation……16
4.4 Syringe Calibration Change…….…..16
4.5 Occlusion Pressure Limit Change……..18
4.6 Occlusion Pressure Verification……..…19
5 Maintenance and Storage…….…20
5.1 Pump Maintenance……..…20
5.2 Transport and Storage……20
5.3 Preventive Testing…….....20
5.4 Environmental Protection……21
6 Electromagnetic Compatibility and Interference…….....21
7 Alarms…….……..22
7.1 Alarms and Actions…….…..…22
7.2 Troubleshooting…….…..…..23
7.3 Service……24
Warranty Terms…….…..…....25

Rev 3

1. Introduction

1.1 Product Introduction

The DigiPump™ SR8x syringe pump is a combination of microelectronic technology and innovation in nursing medicine. It can control the infusion rate and total volume precisely and continuously over long hours on a large scale.

The DigiPump™ SR8x syringe pump is a hi-tech equipment which can be used in all areas of modern nursing. The patient's infusion situation and alarm information (e.g. infusion completion, occlusion) can all be seen at the central station. This greatly improves the medical nursing quality, reduces the nurse's workload, and ensures the patient's nursing safety.

For patient's safety, the DigiPump™ SR8x syringe pump, shall always be installed in a firm place, like an IV pole, when used during patient transport.

1.2 Indication of Use

The DigiPump™ SR8x syringe pump is indicated for use in hospitals where patients need precise and accurate intravenous microinfusion of liquids at steady speed.

1.3 Safety

1. Unqualified and untrained people are not allowed to operate the machine.
2. Precautions for installing the machine.
   ① Place the pump in dry place.
   ② Do not place the pump in places where atmosphere pressure, temperature, humidity, sunshine, dust, salt and ion air may bring damage to the pump.
   ③ Observe the safety of the machine, avoiding drop, vibration or bump the pump (specially during transport).
   ④ Do not use the pump in place which keeps chemical medicine or gives out poisonous gas.
   ⑤ Observe if the voltage, frequency and power of the AC, complies with pump specifications.
   ⑥ Make sure there is no high frequency equipment close to the pump or it can cause interference.
3. Precautions before using the machine:
   ① Make sure the power cord is safely and correctly connected.
   ② Make sure the ON-OFF function and operation of the pump is ok.
   ④ Observe if the patient's vein passage has been established.
4. Precautions during operation
   ① Supervise continuously if the machine and patient are normal.
   ② When detecting anything abnormal with the machine or patients, consider the patient's safety first, then stop infusion and take proper action.
5. Precautions after finishing using the machine
   ① Turn off the power and pull out the power cord as per requirement.
   ② Clean the pump before storing it for convenient use next time.
6. Warning: using improper syringe may cause damage to the syringe.

7. Warning: when using Non standard syringe or setting syringe parameters incorrect, the accuracy may not be maintained and the discrepancy may reach 5% or above. When changing Syringe types and syringe calibration settings, it is the user responsibility to ensure that required accuracy is obtained.
8. Warning: the used syringe shall not be installed on other infusion devices to avoid potential risk.
9. Warning: Keep cell phone or other high frequency power devices away from the syringe pump within 2' (0.6m).
10. Warning: There is no air in line detection sensor in the pump. Make sure that there is no air bubble in the syringe and the infusion set before using.
11. Warning: Stop using the machine when there is alarm.
12. Warning: Do not use the syringe pump in places where flammability and explosion can occur.

1.4 Product functions and features

(1) Precise control of infusion rate.
(2) Precise control of infusion volume.
(3) Smooth flow.
(4) Warning information about infusion completion, near completion, occlusion, low battery, syringe abnormal, control abnormal;
(5) Advanced infusion control.

1.5 Technical Specifications

Product name	DigiPump SR8x
Maximum infusion rate	1500ml/h (Different syringes have different maximum rate.)
Range of flow rate	5ml syringe: 0.1-100ml/h 10ml syringe: 0.1-200ml/h 20ml syringe: 0.1-400ml/h 30ml syringe: 0.1-600ml/h 50ml syringe: 0.1-1500ml/h
Infusion increment	0.1ml/h
Bolus rate	5ml syringe: 100ml/h 10ml syringe: 200ml/h 20ml syringe: 400ml/h 30ml syringe: 400-600ml/h 50ml syringe: 400-1500ml/h
Infusion mode selection	1. Rate mode 2. Time mode 3. Body Weight mode
Rate mode	Speed: 0.1-1500ml/h (maximum value depends on the syringe specifications)
Time mode	Time:1~2000 minutes (33.3 hours) Accumulated infusion volume: 0.1-999.9ml
Body Weight mode	Weight: 0.1~300.0 Kg Drug: 0.1~999.9(mg) Volume: 0.1~999.9ml Dose: 0.1～9999.9 (restricted to unit, drug, solution, weight and syringe specification). Unit: mg/kg/h, ug/kg/min

KVO rate	Adjustable range: 0.1ml/h ～ 5.0ml/h (KVO function starts when occlusion occurs) ; press STOP key to cancel the KVO function when it is unnecessary in use.
IP grade	IPX1
Infusion pressure	The maximum pressure is 0.3Mpa, Occlusion alarm pressure value is 40kPa～160kPa. When pressure value is minimum, infusion rate is 5ml/h, the longest alarm time is 10 minutes.
Preset volume	0.1ml-9999.9ml
Preset time	0~99 hours, 0~59 minutes
Accumulated infusion volume	0.1ml-9999.9ml
Accuracy	±3％
Power supply	AC 100～240V，50/60Hz
Battery	Rechargeable lithium polymer battery, 7.4 V, 1600mAh.
Maximum power consumption	25VA, running more than 4 hours at the rate of 25ml/h after being fully charged.
Battery charge	When syringe pump is connected to AC power, the battery will automatically recharge. (about 8～14 hours to recharge fully.)
Fuses	T2AL250V～
Displayed information	Flow rate; accumulated infusion volume; syringe specification; battery capacity; bed No.; AC power indicator, operation indication, etc.
State indication information	Stop, Run, Bolus, KVO
Alarm information	NEAR completion, OVER, OCCLUSION, low battery, abnormal 1 (communications failure), abnormal 2 (pump stuck), abnormal 3 (wrong parameter), volume limited alarm, no AC power
Maximum enclosure size	380mm×190mm×180m（14.9”×7.5”×7.1”）
Maximum weight	＜3.0Kg (6.6lb)
Classification	Class II, Type BF
Enclosure material	ABS plastic
Operating conditions	Environment temperature 5℃~40℃, air pressure 80kPa ~106kPa，relative humidity ≤80%
Storage conditions	Environment temperature -40℃~55℃, air pressure 50kPa~106kPa，relative humidity ≤95%
Applicable syringes	5ml、10 ml、20 ml、30ml、50 ml syringes
Electrical safety	In accordance with IEC60601-1 Standard

1.6 Product Description

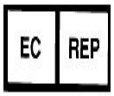
The DigiPump SR8x syringe pump contains the following components:

1. The microcomputer system: the “brain” of the whole system, that control and manage the whole system and process the detected signals. Two single-chip Microcontrolers are used for mutual backup copy and supervision. When one Microcontroler goes wrong, the other one will give an immediate warning signal and cut the power of the host computer, which will then stop completely, thus ensuring patient’s safety.
2. The Pump Device: the “heart” of the whole system and the main driving force of the infusion. Driven by stepper motor, the lead screw moves the infusion piston forward.
3. The Sensor System: various kinds of sensors, such as displacement sensor (detecting liquid flow rate and flow volume), pressure sensor (detecting occlusion), etc. They supply corresponding signals which will, after being amplified, be sent over to the computer for signal processing.
4. The alarm device: after the signal given by the sensor is processed by the microcomputer, an alarm control signal triggers the corresponding audio and visual alarm bringing operator’s attention for right action. There are mainly two kinds of alarms: Visual alarm (LED) + Alarm Message in the screen and sound alarm (buzzer).
5. The Keypad and Display device: It is used to set infusion parameters, such as infusion volume and infusion rate. It displays various parameters and the current operation progress on the LCD display.
6. The rechargeable battery: provides internal power for the pump when there is no AC power.

1.7 Symbols and Labels

1. Product label pattern (placed on the bottom of the pump enclosure):

2. Label Mark

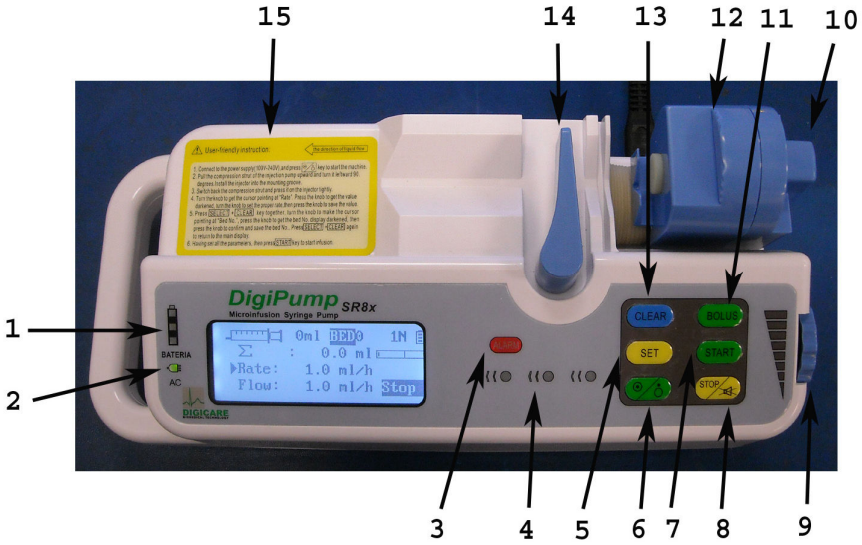
Mark	Description
	Production batch No.
	Serial Number
	Caution! Consult user manual
	Class II equipment
	Type BF applied part
IP21	Protection against vertically falling water drops
	It indicates that the equipment should be sent to the special agencies according to local regulation for disposal after its useful life.
	Date of production
	Manufacturer
	CE mark
	Alternating current
	European Representative

3. Standard configuration in the packaging box

1. Syringe pump one set
2. AC power cord one pc
3. Operator's manual one pc

※ Please contact Digicare if there are components above mentioned missing when you open the packaging.

1.8 Product Components



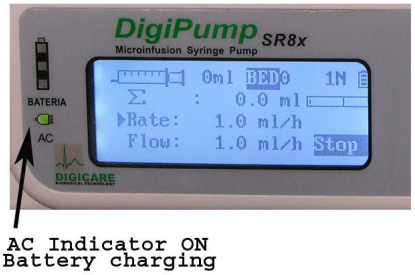
No.	Description	Function
1	Battery indicator light	Flashing when there is no AC power connection.
2	AC power indicator light	AC indicator light is on when using AC and the pump in turned-on.
3	Red alarm light	Flashing when there is alarm signals.
4	Infusion indicator light	After the infusion starts, the three lights flash alternately from left to right. When the infusion is over, all three lights are off.
5	SET key	In 'STOP' condition, press the SET key to enter or quit the Infusion Mode Settings screen.
6	POWER key	Turn on the pump: Press this key for about 2 seconds. Turn off the pump: Press this key for about 3 seconds. Night vision function: Press this key for about 5 seconds to open or close this function after turning on the pump.
7	START key	Start infusion after the installation and parameters setting.
8	STOP /CLEAR	Press the key to stop infusion and silence the alarm at the same time.
9	Knob	Knob is used to adjust the parameters and cursor. Press the knob to clear the alarm for 2 minutes and confirm the value newly set.
10	Clutch button	Keep pressing the button to move the piston freely. When unfastening the button, the clutch will gear, and can only be moved by the engine.
11	BOLUS key	After pressing START, press and hold BOLUS key to inject at maximum rate. It returns to original

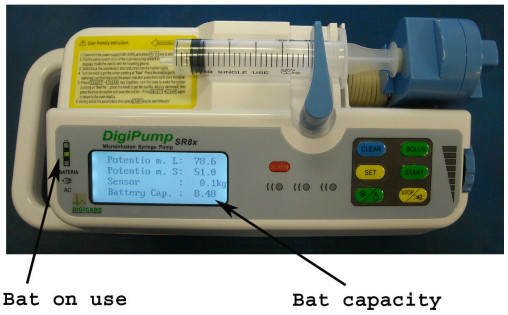
		speed after releasing this key. On settings menu screen, press “BOLUS” to unlock the syringes parameters. The Start-up syringe default parameters are in locked condition, and can not be changed in this condition.
12	Piston	Push the piston of the syringe.
13	CLEAR key	In STOP condition, press the key to clear the accumulated volume. CAUTION: On Settings menu screen, all syringes parameters will be cleared when press CLEAR key in the unlock condition. Then the syringes can not be detected, and you have to reset the syringes parameters.
14	Syringe Holder	It holds back the syringe to avoid syringe dropping.
15	Quick Help	Guidelines
	SET+ CLEAR	In STOP condition, press both keys simultaneously to enter or quit the Settings Configuration menu.
	SET+STOP	In STOP condition, press both keys simultaneously to enter or quit the Sensor screen.
	Cursor	◗ Points to the parameter to be set.

1.9 Battery Operation

1. As shown in figure 1, after the pump is connected to the AC power and turned on, the AC indicator light is on and the battery begins to charge automatically. When the battery is fully charged, it will stop charge automatically.
2. As shown in figure 2, the AC indicator light will be off if the AC power is disconnected. And the battery indicator light is flashing, which means the syringe pump is using the battery capacity. The syringe pump will issue a warning sound to alert the user to charge the battery when the battery power shortage.

※It requires 8～14 hours to charge the battery fully after it is fully depleted.



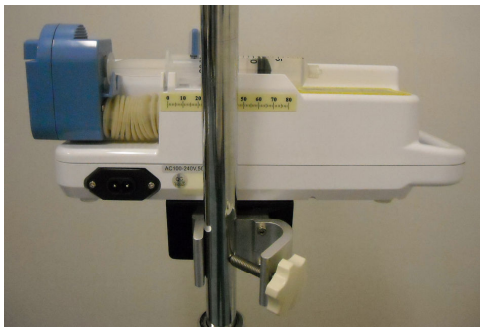


1.10 Pump Installation

1. The syringe pump is used in horizontal position.
2. Make sure the screw center with thread hole in the enclosure, then rotate the screw to fasten the clip on the syringe pump.

3. Check the stability of the IV stand.
4. Rotate the second clip screw to fasten the syringe pump on the IV stand.

Setting of Menu Parameters



2. Infusion Settings

The DigiPump SR8x syringe pump has three Infusion Modes, Rate Mode (1), Time Mode (2) and Body Weight Mode (3). The Rate Mode is the default mode and is automatically selected when the pump is turned-on.

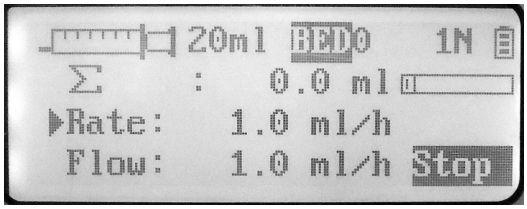
All settings are done using the rotary knob.

1. Rotate the knob to move the cursor.
2. Press the knob to select.
3. Rotate the knob to change the value of the selected setting.
4. Press the knob to save the setting.

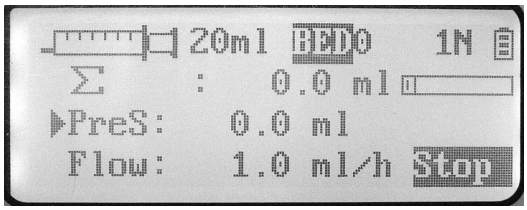
2.1 Rate Mode

After turned-on, the Rate mode is displayed on the screen and the cursor points to Rate.

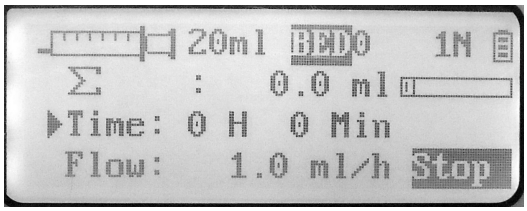
Rate: Set the Rate in ml/h.



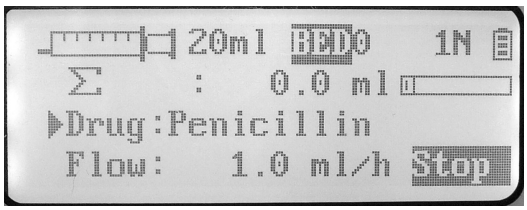
PreS: Set the Volume to be infused in ml. "0" indicates PreS function is OFF. Note: Not available in Time Mode.



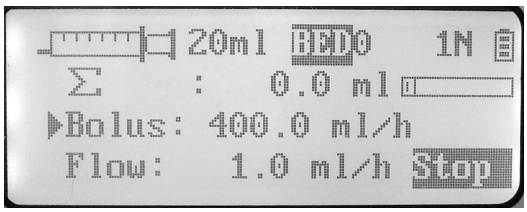
Time: Set the Time in Hours and Minutes for infusion.



Drug: Set the drug being used.



Bolus: The bolus rate for the 5,10 and 20ml syringes are fixed at 100, 200 and 400ml/h respectively. The bolus rate for 30ml syringe is 400 ml/h and can be changed from 400 to 600ml/h.
The bolus rate for the 50ml syringe is 400 ml and can be changed from 400 to 1500ml/h.



Flow: Flow Rate programmed indicator in ml/h.

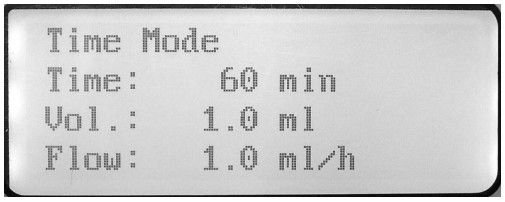
When the Volume to be infused is set, the Preset indicator change from N to P. When the infusion is started, the programmed Volume will be infused at the programmed flow rate. When the programmed Volume finishes, the Preset indicator returns to N.

When the Time to be infused is set, the Preset indicator change from N to T. When the infusion is started, the programmed Flow Rate will infuse during the programmed Time. When the programmed Time finishes, the Preset indicator returns to N.

If both Volume and Time are preset, the Preset indicator will display the first programmed and will execute the first programmed first. When the first preset parameter finishes, press STOP and press START to start the second parameter preset.

2.2 Time Mode

In Time Mode, user sets the Time of the infusion in minutes, the Volume to be infused in ml and the resulting Flow Rate is automatically calculated and programmed.

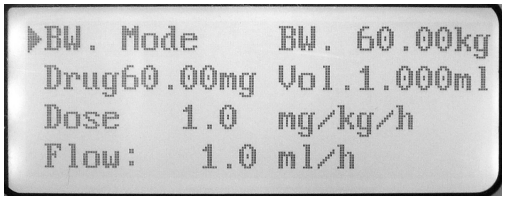


Press the SET key to change the Infusion Mode. The cursor points to Rate Mode. Press the Knob to select and rotate the Knob to change to Time Mode and press the Knob again to select the Time Mode. Rotate the Knob moving the cursor to Time, press the knob to select and rotate the Knob to change the time programmed for the infusion in minutes and press the Knob to save the Time setting. Rotate the Knob to Vol (Volume to be infused). Press the Knob to select and rotate the Knob to change the Volume setting. The Flow Indicator automatically indicates the resulting programmed Flow Rate in ml/hr. Press the Knob to save the settings. Press SET key to return to main screen.

2.3 Body Weigh Mode

In the Body Weight mode, the user sets the following parameters and the resulting Flow Rate is automatically calculated and programmed.
Body Weight (BW): Patient's body weight in Kg. (Note: 1.0 Kg = 2.2 lb)
Drug concentration: Drug amount measured in mg.
Volume (Vol): Volume of Drug concentration per ml.
Dose: Desired Drug dose in mg/kg/h or ug/kg/min.

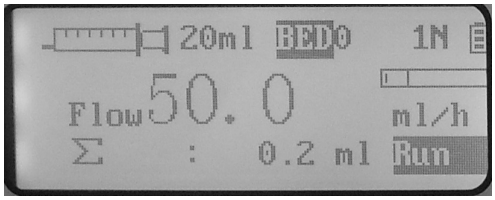
Press the SET key and using the rotary Knob set all required parameters.



※ Body Weight Mode Flow conversion:
mg / kg / h flow rate = DOSE x WEIGHT x FLUID VOLUME / DRUG
ug / kg / min flow rate = 60 x DOSE x WEIGHT x FLUID VOLUME / DRUG / 1000

2.4 Volume and Time Indicators

During infusion, in RUN status, the accumulated infusion volume is displayed. Turn the adjusting knob to display the Preset Volume, Preset Time, Drug and Bolus indicators.

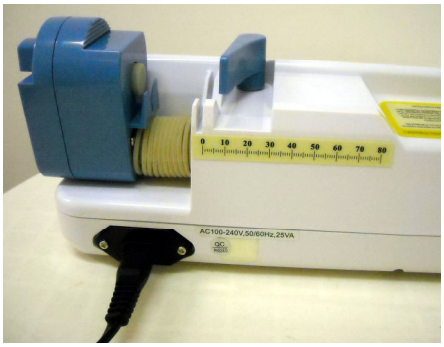


3. Operation

3.1 Basic Operation Steps

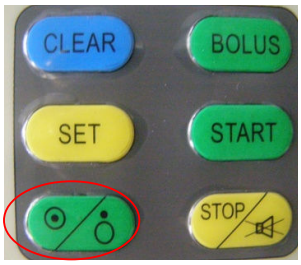
Step 1 Power connection

Attention: Insert the power cord into the power supply (50/60 HZ, AC 100 V～240V).
Connect the power cord as shown.



Step 2 Turn the Power On

Turn on the power, the syringe pump will display version and ID information as shown.



Step 3 Install the syringe

Install the syringe as shown in the figure.

(1)Press STOP key;

(2)Press clutch button, drag piston to fit the desired syringe;

(3)Pull the Syringe Holder and move 90° to the left or right.

(4)Before the installation, manually remove all the air inside the syringe and then place the syringe on the mounting grooves;

(5)Return the Syringe Holder to original position compressing and holding the syringe in place. When the Syringe Holder compresses the syringe, the syringe size indicator is displayed in the screen.

Step 4 Select the Infusion Mode and Flow Rate settings

(1) Press STOP key once.

(2) Set the infusion parameters as Flow Rate, Volume to be Infused and Infusion Time.

Step 5 Clear accumulation

(1) Make sure the pump is in stop condition

(2) Press" CLEAR" key to eliminate the accumulated volume.

Note: accumulated volume can be cleared only in STOP condition.

Step 6 Start the infusion

(1) Verify the syringe installation and the numerical indicators, and make sure the corresponding syringe indicator light is on.

Attention: Press CLEAR key to clear the accumulated volume before pressing START key, if you don't want to add this volume to the new infusion.

(2) Press START key, the syringe pump starts infusion. The infusion indicator in the lower right side of the screen displays the 'infusion' status. The Infusion indicator speed is proportional to the Infusion Rate.

Step 7 BOLUS Infusion

During the infusion process, the 3 infusion indicator lights will flash alternately from left to right. If Bolus infusion is required, press and hold the BOLUS key during infusion, the machine will infuse at maximum rate for the syringe in use. The Infusion Rate returns to original rate after releasing the BOLUS key.

Size of syringes	Bolus rate
5 ml	100 ml/h
10 ml	200 ml/h
20 ml	400 ml/h
30 ml	400～600 ml/h
50 ml	400～1500 ml/h

Step 8 Infusion complete

(1) When the infusion is near completion, the alarm indicator light flashes and LCD screen displays 'NEAR' to remind the user that the infusion will complete soon.

Attention: press the knob to temporarily stop the alarm. It sounds again in two minutes.

(2) When the infusion is finished, the pump stops infusion and the OVER message is displayed on the LCD screen. **Attention:** press the knob to temporarily stop the alarm. It will sound again after two minutes.

Step 9 Turn off the power

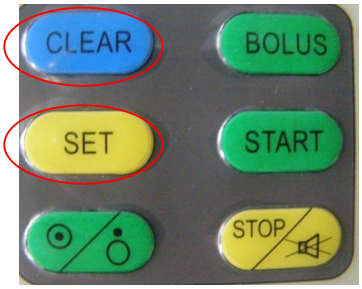
Press "POWER" for 3-5 seconds and then release it, the machine power is turned-off.

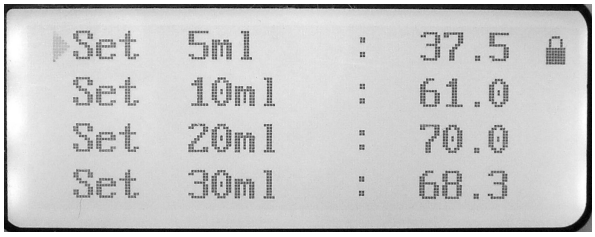
4. Configuration

4.1 Configuration Screen

The DigiPump SR8x syringe pump is pre-configured with default settings. The accuracy of the syringe pump for each different syringe depends on these settings and can be changed by the user.

To enter in the Configuration screen, under STOP condition, press “CLEAR+SET” keys simultaneously. Pressing “CLEAR+SET” keys again, returns to the original screen.





The parameters are preset in the factory as table 1:

Table 1

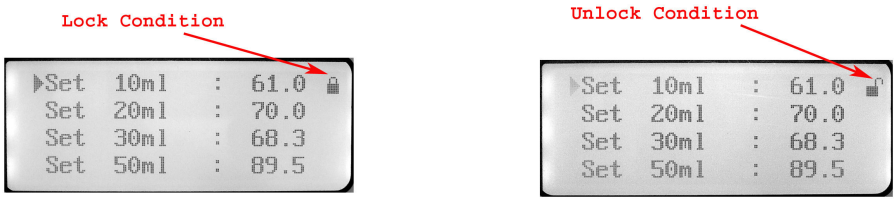
The parameter selected	Suggested parameter value.
5ml syringe Manufact: BD	44.0 (set in unlock state) (Save setting value after shut down)
10ml syringe Manufact: BD	61.0 (set in unlock state) (Save setting value after shut down)
20ml syringe Manufact: BD	70.0 (set in unlock state) (Save setting value after shut down)
30ml syringe Manufact: BD	81.8.3 (set in unlock state) (Save setting value after shut down)
50ml syringe (60 ml) Manufact: BD	89.5 (set in unlock state) (Save setting value after shut down)
Basic occlusion value	0.1Mpa (Save setting value after shut down)
KVO speed	0.1~5.0, default value: 0.1, Select OFF function to close KVO
ID No. setting	The after four-digit of the Machine Serial No. (Save setting value after shut down)
Bed No.	The No. of the bed the machine placed. (Save setting value after shut down)
Near completion alarm	ON (Save setting value after shut down)

4.2 Configuration Menu Description:

1. 5~50 syringe: This parameter is determined by the length of the syringe in milimeters. This value sets the syringe rate accuracy. Specific instructions to change the syringe manufacturer or type are described on [4.4 Syringe Calibration Change].
2. Basic occlusion value: 0.04～0.16Mpa. Default value is 0.1Mpa. This value sets the occlusion alarm sensitivity of different syringes.
3. KVO speed: the adjustable range is 0.1~5.0ml/h, the default value is 0.1ml/h. It enters into KVO state in the course of occlusion after running. Set the value to "OFF" to disable KVO function.
4. ID No. setting: The value is the last four-digit of the syringe pump Serial No. in order to identify each single machine. The adjustable range is 0~9999.
5. Bed No: This value is the BED No. where the syringe pump is placed. The range is 0~999. When no alarm is triggered, the bed No. is displayed at the first line of the main screen and is overwrite by any alarm message when triggered.
6. Near On/Off: The NEAR completion alarm can be enabled or disabled in this setting.

4.3 Configuration Menu Operation

Enter the Configuration Menu. Turn the knob to move the cursor through all different parameters. The lock icon in the upper right of LCD is locked by default. In the locked state the user can not change settings. Press “BOLUS” key to enter the unlock state. Press the Knob to highlight the parameter. Turn the Knob to adjust the parameter setting and press the Knob to save and lock the parameter setting. After all parameter settings change, press CLEAR+ SET to return to STOP condition.

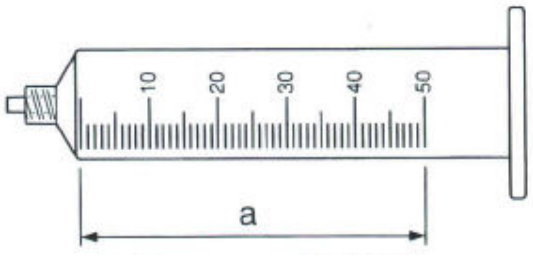


4.4 Syringe Calibration Change

The DigiPump SR8x syringe pump is calibrated in the factory to the following disposable syringes:

	Sizes for Reference in (mm)				
	5ml	10ml	20ml	30ml	50ml
BD	44.0	61.0	70.0	81.8	89.5

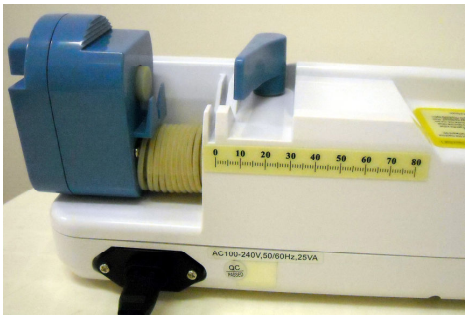
Length from Size indicator marking to 0ml

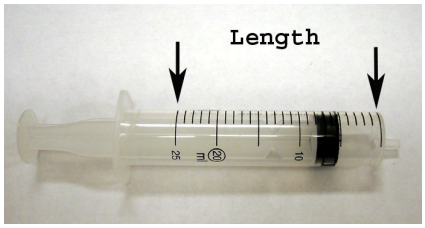


Step (1) Get one new brand syringe of each size to change the Syringe Calibration factor, (5ml, 10ml, 20ml, 30ml and 50ml).

Step (2) measure the length of syringes

1. Put the syringes at the calibration ruler and measure the distance from Zero (0) to the syringe size indicator marking. In the 20ml syringe figure bellow, the length is from 0 to 20ml. For example, the BD 20ml syringe length is 70.0mm.
2. This part of the process is done with empty syringes. The syringe needs to be correctly installed in the pump as follow, in order to achieve correct calibration.





Step (3) Turn-On the DigiPump SR8x syringe pump. Install the 50ml syringe, or smaller size to change. Repeat the process for other syringes decreasing the size each step.

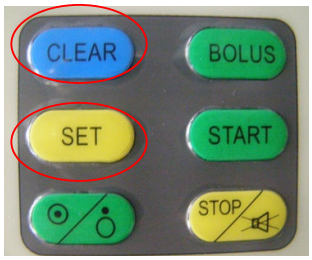
Warning: The correct installation of the syringe and the piston is essential when changing the calibration settings or error may occur.

Push the syringe piston to compressing the syringe all the way to the end.

Step (4) Change Syringe Parameters

ATTENTION: Each syringe has two calibration parameters: the length in mm used to adjust the Flow Rate accuracy and the height used by the Syringe Size indicator.

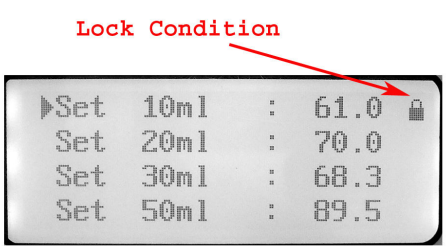
1. Stop condition, press ‘CLEAR’ and ‘SET’ keys simultaneously to enter the Configuration Menu screen.

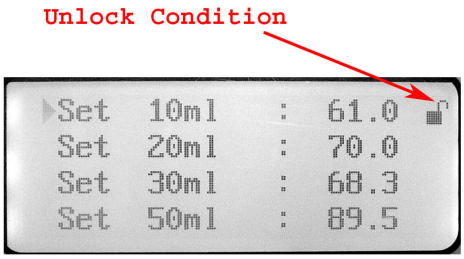


2. The “Length” parameters are in LOCK condition and can not be changed. Press ‘BOLUS’ key to unlock and set the parameters. Press "BOLUS" key once again to save and lock the Configuration Menu screen.

ATTENTION: ①. Syringe Length parameters are in LOCK condition when the pump is on and Length parameters can only be set in UNLOCK condition.

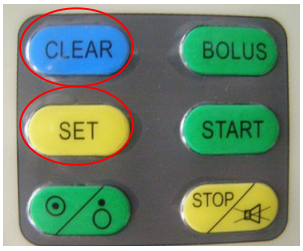
②. Syringe Length parameters refer to syringes of 5ml, 10ml, 20ml, 30ml and 50ml. ‘LOCK’ and ‘UNLOCK’ function is only effective to these five parameters.





3. 50ml syringe setting: on Configuration Menu screen, rotate the knob to point the cursor to Set 50ml syringe. Press BOLUS to unlock. Press the knob to select the setting. Rotate the knob to change the setting value. Press the knob to save the new setting and lock.

4. Repeat the process for each syringe to change settings. Press ‘CLEAR’ and ‘SET’ keys simultaneously to enter the Configuration Menu screen.

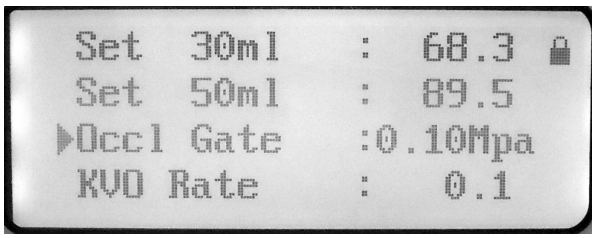


5. Flow Rate accuracy for the new syringe relies on the Length adjustment. The user shall do one Test infusion with water, at maximum Flow Rate, using one calibrated recipient or one syringe to measure the infused volume. Fine adjustment can be done in the Length calibration setting using the error measured.
Example: New 20 ml syringe adjusted with 65 mm length.
Set the Flow Rate to 400 ml/h and PreS to 10 ml.
Start the Infusion. When the infusion finish, suppose the actual volume infused in the calibrated recipient is 9 ml. The error is 9-10 = -0.1 = -10%.
Increase the Length calibration setting +10% = 65 x 1.1 = 71.5
Repeat the Infusion in the calibrated recipient and verify if the error is in the specified range of +/- 3%

4.5. Occlusion Pressure Limit Change:

1. The occlusion pressure default is set to 0.1 Mpa (14.5 PSI), and the adjustable range is 0.04 ~ 0.16 Mpa (5.8 to 23.2PSI). The actual occlusion pressure for one specific syringe will vary with the dimensions and resistance of the syringe.

To change the occlusion pressure alarm limit, press the SET + CLEAR keys. Rotate the Knob to point the cursor to OCCL Gate :0.10 Mpa In the Configuration Menu.



Increase the Occl Gate setting in steps of 0.01Mpa (1.45 PSI), in order to decrease the Occlusion alarm sensibility. (Maximum is 0.16Mpa).

Decrease the Occl Gate setting in steps of 0.01Mpa (1.45 PSI), in order to increase the Occlusion alarm sensibility. (Minimum is 0.04Mpa).

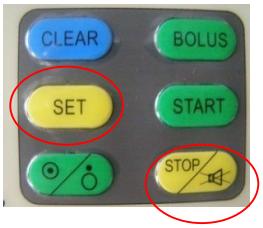
4.6 Occlusion Pressure Verification

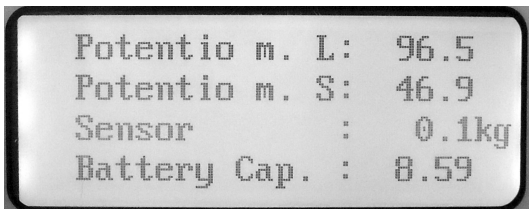
The Occlusion alarm pressure can be verified using one calibrated manometer. The DigiPump SR8x internal pressure sensor output, can be read in the screen for verification only.

Place one 10 ml syringe filled with water. Install one administration, fill with water and connect to the manometer input or just close the administration set output to create one occlusion.

Program the Flow Rate to 400 ml/h and Start infusion. To access the internal sensor output value

screen pressing the SET+STOP keys simultaneously.





Verify in the manometer the pressure at witch the occlusion alarm is being triggered. The default is 0.1Mpa = 14.5 PSI ~ 1.8kg in the Sensor display.

Press SET+STOP keys to turn back to the infusion screen.

5. Maintenance and Storage

5.1 Pump maintenance

1. Keep the pump clean. Use a piece of cloth to wipe the syringe pump clean when any liquid drops on the pump.
2. Special attention must be paid when cleaning the syringe pump. Use a tampon moistened with 75% of alcohol to wipe the outer case.
3. Make sure the AC power is disconnected and the pump is turned off.
4. Do not clean the syringe pump by using xylene, acetone or similar corrosive cleaning products to avoid outer case damage.

The above mentioned operation is just for guidance. More proper methods should be used for sanitizing effect inspection.

5.2 Transport and Storage

Transport and Storage environmental conditions: temperature: -40C～55C，air pressure: 50 kPa～106kPa，relative humidity: ≤95%.

5.3 Preventive testing

1. Flow Rate accuracy check.
   Use one volume calibrated recipient to verify Flow Rate and Volume accuracy every time new syringes are being used or every six months.
2. Battery Inspection
   - Batteries have limited life time. Replace the batteries when they are not holding charge. If replacing batteries are required, please contact Digicare. Model: Lithium Polymer battery （7.4V，1600mAh）.
   - Use the pump running in its internal battery at least once a month till its depletion and the power of the pump turns off automatically, for insuring battery performance and

prolonging its life. After battery depletion, recharge 8～14 hours for next use.

- The following inspection need to be taken every six months.
  （1） Connect to AC power, about 8 hours for recharging.
  （2） Turn on the syringe pump and install 50ml syringe.
  （3） Set up infusion rate: 25ml/h and start syringe.
  （4） Observe operation of the syringe pump till it turns off based on low battery.
    - If the syringe pump takes 90 minutes or even longer time from starting infusion to shutdown, the battery is in good condition.
    - If the syringe pump takes 45-90 minutes from starting infusion to shutdown, the battery life close to its end.
    - If the syringe pump takes less than 45 minutes from start infusion to shutdown, the battery is up to its end and recharge of battery is required.
  （5） After battery inspection, recharge the battery again for usage next time.

3．Routine Maintenance

intervening time	Routine maintenance procedures
According to hospital policy	Thoroughly cleaning of syringe pump case is required before or after long period of storage.
At least once a year for inspection	1．Inspection of AC power cord and wires.

5.4 Environmental Protection

The life time of the products is 3 years. Machines over its life should be discarded, please contact the manufacturer or distributor for more relevant information.

1. DigiPump SR8x syringe pumps that are no longer in use could be delivered to its distributors or manufacturer for proper recycling.
2. Used Lithium Polymer batteries could be delivered to its distributors or manufacturers for handling, or handling it as per applicable laws and regulations.

6. Electromagnetic Compatibility and Interference

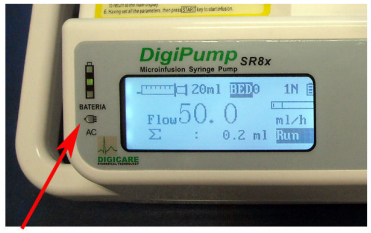
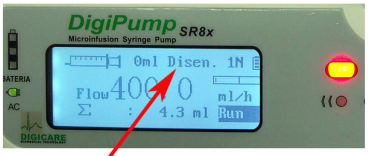
This pump has a function to prevent external interference, including high-intensity radio frequency radiation, magnetic field and static. Users should avoid the use of the mobile phone within 0.5 meters from the machines.

This pump is quite low in electromagnetic frequency, which will not interfere with the surrounding electronic equipments. However, the pump will cause a certain amount of electromagnetic radiation, which is within the requirement of IEC/EN 60601-1-2 and IEC/EN60601-2-24. If the pump interferes with other equipment, measures must be taken to reduce this kind of interaction, such as the relocation of the two instruments.

7. Alarms

7.1 Alarms and Actions

Description	Display	Reason	Solution
NEAR alarm		The syringe is almost empty and close to end of infusion	1.press the knob to cancel the alarm(the alarm will ring again after two minutes) 2. Press STOP key to stop the syringe pump and cancel the alarm.
OVER alarm		The syringe is empty and infusion is finished	1. Press the knob to cancel the alarm(the alarm will ring again after two minutes) 2. Press STOP key to stop the syringe pump and cancel the alarm.
Occlusion alarm		1. Syringe or administration set with occlusion 2. Occlusion alarm need sensitivity adjustment 3. Syringe pump pressure sensor has problem	Solution for No.1 ： Press STOP key to stop the syringe pump and cancel the alarm, eliminate infusion occlusion, then press the START key to start infusion once again. Solution for No.2： Refer to Occlusion Pressure Limit Change 4.5 Solution for No.3： Contact Digicare Technical support
Low battery		1. Battery too low 2. Bad battery aging or something wrong with the battery charge circuit	Solution for No.1： Connect to AC power supply to charge the battery Solution for No.2： Contact Digicare Technical Support

AC indicator is OFF	 AC LED OFF	1. No AC power supply for the syringe pump. 2. Something wrong with the power supply circuit of syringe pump.	Solution for No.1: Check if the power cord is not plugged in or not properly plugged in. Solution for No.2: Contact Digicare Technical Support
Alarm for installation error	 Disengaged Alarm	1. The syringe fall off or is not installed well. 2. The parameter is setting incorrect. 3. Something wrong with the sensor of syringe pump	Solution for No.1: Reinstall the syringe Solution for No.2: Refer to item 4.4 Syringe Calibration Change Solution for No.3: Contact Digicare Technical Support
Alarm for malfunction	 WRONG2 alarm	1. Something wrong with the CPU control 2. the operation of Electric Machines is wrong 3. check the parameter incorrectly	Solution for No.1: Contact Digicare Technical Support Solution for No.2: Contact Digicare Technical Support Solution for No.3: Reset all of the parameter

7.2 Troubleshooting

Description	Result	Cause	Solutions
Press START key but the light for LED operation is not on.	The syringe pump does not work.	The syringe is not properly installed. The syringe configuration parameter is not rightly set.	Reinstall the syringe. Check if the right indicator light is on. Or configure the syringe settings.
Turn the knob but the speed of syringe does not change.	The speed of syringe pump does not change.	The syringe pump cannot be set during operation.	Press STOP key to stop the syringe pump. Turn the knob to set the needed value and press the knob to save the value.
Low Battery .	The syringe pump will turn off if not connected to AC power.	Bad battery. The syringe pump can not be used before it is connected to A.C. electric supply.	Connect the syringe pump to A.C. power supply before operation.

The occlusion alarm signal sounds soon after the syringe pump starts operation.	The occlusion light is on and the syringe pump stops.	The occlusion sensitivity value of the syringe pump is not properly set.	Reset the occlusion sensitivity value.
Wrong syringe size	The indicator light of the corresponding syringe is not on	The compressed strut is not tightly pressed on the syringe. Or the syringe settings is not rightly set.	Pull the compressed strut of the syringe up, reinstall the syringe and press it onto the syringe tightly. Or reset the syringe settings.

7.3 Service

Attention:

1. If there is any untreatable fault or question, please stop using the Digipump SR8x Syringe Pump and contact Digicare for Technical Support and Service.

2. Unauthorized person has no right to repair this product; otherwise Digicare will take no responsibility.

WARRANTY TERMS & CONDITIONS

DIGICARE BIOMEDICAL TECHNOLOGY, INC. covers all of their infusion pumps with a 1 year warranty:

Infusion Pump DigiPump SR8x: 1 year parts and labor

Accessories: 90 days on accessories only

DIGICARE BIOMEDICAL TECHNOLOGY, INC. **will provide the necessary parts and labor to maintain the monitor (s) listed on the Warranty Certificate in a usable condition during the covered period.**

DIGICARE BIOMEDICAL TECHNOLOGY, INC. **will, at its option, repair or replace any product which proves to be defective during the warranty period, if returned to the factory with prior authorization, transportation prepaid.**

Not covered by this agreement are repairs necessitated by any of the following conditions:

1 - Inadequate power or power failure.

2 - Neglect, abuse or misuse of equipment.

3 - Servicing of equipment by person's other than DIGICARE INC.

4 - Any unit opened or tampered with, without prior authorization.

When returning an infusion pump for warranty repair, you must first contact DIGICARE BIOMEDICAL TECHNOLOGY, INC. to receive a Returned Goods Authorization Number (RGA #) that is to be clearly marked on top of the shipping carton. Please make sure that your company name, shipping address, area code and telephone number and person to contact is located in and/or on the box. ANY UNIT THAT IS RETURNED TO THE FACTORY WITHOUT AN RGA# WILL BE REFUSED.

Model # _____ Serial # _____

Dealer Name:_____

Date Equip. Purch.: ___/ ___/____ Expiration Date: ___/____/____

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